

WHAT IS CLAIMED IS:

1. An apparatus for reproducing information in an optical disk of a first recording density and in another optical disk of a second recording density lower than the 5 first one, comprising:

a light source which emits a main beam and sub-beams onto adjacent tracks formed in an optical disk;

10 a photodetector which detects reflection lights of the main beam and the sub-beams emitted by said light source from the optical disk; and

15 a reproduction device which reproduces information in the optical disk based on signals received from said photodetector;

wherein the main beam emitted by said light source has a size in correspondence to resolution of the optical disk of the first recording density in a direction tangent to the tracks and has a shape longer in a direction perpendicular to the tracks;

20 wherein said reproduction device has a first canceler which cancels cross talk components from adjacent tracks included in signals reproduced from reflection light of the main beam by using signals reproduced from reflection lights of the sub-beams.

25 2. The apparatus according to claim 1, wherein a ratio of length in major axis to length in minor axis of the

main beam is between 1.2 and 1.5.

3. The apparatus according to claim 1, wherein said reproduction device reproduces information recorded in the optical disk of the first recording density with the main beam and the sub-beams by using the first canceler and reproduces information recorded in the optical disk of the second recording density only with the main beam.

4. The apparatus according to claim 1, wherein the apparatus reproduces information in the optical disk of the first recording density and in the optical disk of the second recording density wherein a ratio of pit width in the optical disk of the first recording density to that in the optical disk of the second recording density is between 1.5 and 2.0.

15 5. The apparatus according to claim 1, further comprising a tracking controller which controls tracking of an optical head having said light source based on output signals of said photodetector;

20 wherein said tracking controller comprises a tracking error signal generator, and said tracking error signal generator generates tracking error signal based on phase difference between signals of the reflection light of the main beam divided into a plurality of portions detected by said photodetector when information in the optical disk 25 of the first recording density is reproduced, and generates

the tracking error signal based on signals of the reflection light of the sub-beams detected by said photodetector when information in the optical disk of the second recording density is reproduced.

5 6. The apparatus according to claim 1, further comprising a tracking controller which controls tracking of an optical head having said light source based on output signals of said photodetector;

10 wherein said tracking controller comprises a push-pull tracking error signal generator which generates push-pull tracking error signal based on the reflection light of the main beam, and a second canceler which cancels cross talk components due to adjacent tracks included in the push-pull tracking error signal generated by said push-pull tracking error signal generator with the reflection light of the sub-beams.

15 7. The apparatus according to claim 1, wherein information is reproduced from the optical disk wherein discrimination marks are formed at predetermined constant distance along tracks, wherein said first canceler comprises:

20 a delay device producing a relative time difference between reproduction signals due to a first beam in the main and sub-beams emitted by said light source and
25 those due to a second beam in the main and sub-beams

emitted by said light source;

a track jump device which jumps the beams emitted by said light source to an adjacent track in the optical disk;

5 a timer which measures a time difference after a first discrimination mark is detected with the first beam in a track in the optical disk until, after the second beam is jumped to the track, a second discrimination mark is detected with the second beam in the track; and

10 a delay quantity determining device which determines the delay quantity of said delay device according to a time between the time difference measured by said timer and a time distance between the first and second discrimination marks in correspondence to the predetermined constant distance.

15 8. The apparatus according to claim 7, wherein said delay device sets the delay quantity in the unit of clock period of clocks for reproducing information by said reproduction device.

20 9. The apparatus according to claim 7, wherein said delay device delays the reproduction signals in the unit of clock period of clocks for reproducing information by said reproduction device.

25 10. An apparatus for reproducing information in an optical disk discrimination marks are formed at

predetermined constant distances, comprising:

a light source which emits a main beam and sub-beams onto adjacent tracks formed in an optical disk;

5 a photodetector which detects reflection lights of the main beam and the sub-beams emitted by said light source from the optical disk; and

a reproduction device which reproduces information in the optical disk based on reproduction signals of the main beam detected by said photodetector;

10 wherein said reproduction device discriminates a first discrimination mark in a track with a first beam in the main and sub-beams and a second discrimination mark in the track with a second beam in the main and sub-beams after the second beam jumps to the track, determines a time difference when the first and second discrimination marks are discriminated, and cancels cross talk between tracks according to the time difference and a predetermined time difference in correspondence to the predetermined constant distance of the discrimination marks.

15 11. The apparatus according to claim 10, wherein said reproduction device determines the time difference in the unit of clock period of clocks for reproducing information by said reproduction device.

20 12. The apparatus according to claim 10, wherein said reproduction device corrects the time difference in the unit

of clock period of clocks for reproducing information by said reproduction device.

13. A method for reproducing information in an optical disk discrimination marks are formed at predetermined constant distances, comprising the steps of:

emitting a main beam and sub-beams onto adjacent tracks formed in an optical disk;

detecting reflection lights of the main beam and the sub-beams emitted by said light source from the optical disk; and

reproducing information in the optical disk based on reproduction signals of the main beam detected by said photodetector while canceling cross talk between tracks;

wherein said reproducing step comprising the steps of discriminating a first discrimination mark in a track with a first beam in the main and sub-beams, jumping a second beam in the main and sub-beams to the track, discriminating a second discrimination mark in the track with the second beam, determining a time difference when the first and second discrimination marks are discriminated, and canceling the cross talk between tracks according to the time difference and a predetermined time difference according to the predetermined constant distance of the discrimination marks.

25 14. The method according to claim 13, wherein the

time difference is determined in the unit of clock period of clocks for reproducing information.

15. The method according to claim 13, wherein the time difference is corrected in the unit of clock period of
5 clocks for reproducing information.